LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Sept. 23-27, 2013.

THE WEATHER CHANNEL IS THAT AN ISLAND OUT THERE?

An island off of Gwadar formed after this week's 7.7 earthquake in Pakistan.

Tuesday's major earthquake in southern Pakistan led to some reports of a new island appearing just off its coast.

Following the 7.7-magnitude earthquake, witnesses reported that a small island appeared near the Arabian Sea port of Gwadar, about 150 miles northeast of the quake's epicenter.

But is it a new island? If it is, it may not be there for long.

Rob Mellors, a researcher at Lawrence Livermore, specializes in seismology in Central Asia and the Middle East, says the region has seen these instant islands in the past. "In 1945 there was a big earthquake, an 8 [magnitude], offshore, that created islands that lasted three months," Mellors said.

To read more, go to the Weather Channel.

INTERNATIONAL BUSINESS TIMES

TRANSFORMATIVE ENERGY

Researchers at the National Ignition Facility are attempting to create nuclear fusion, the same source that powers the sun.

Nuclear fusion, the engine that powers the sun, could potentially transform human society if it could be harnessed. Researchers at Lawrence Livermore's National Ignition Facility are attempting just that.

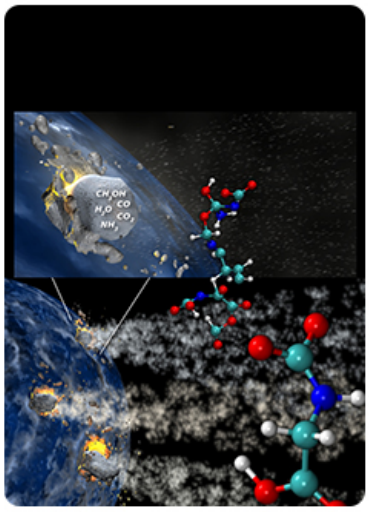
To create fusion in the laboratory is relatively simple on its face: the nuclei of hydrogen atoms fuse together and, in the process, release energy -- a lot of energy. A single gram of deuterium and tritium, which are variations of hydrogen, can produce nearly 10 million times the amount of energy from the same amount of fossil fuels, without greenhouse gas byproducts.

For decades, scientists have struggled to reach "ignition," the point at which the fusion reaction starts producing more energy than the power put into it. In stars, fusion occurs due to the intense pressures of gravity; here on Earth, scientists have to find a different approach. In a recent paper appearing in the journal *Physics of Plasmas*, the staff from the National Ignition Facility reports on progress toward the ignition point using high-powered laser beams.

To read more, go to *International Business Times*.

Los Angeles Times

A SHOCKING SOURCE OF LIFE



Comets contain elements such as water, ammonia, methanol and carbon dioxide that could have supplied the raw materials that upon impact on early Earth, would have yielded an abundant supply of energy to produce amino acids and jump start life.

The scientific evidence is mounting that life on Earth may have come from space.

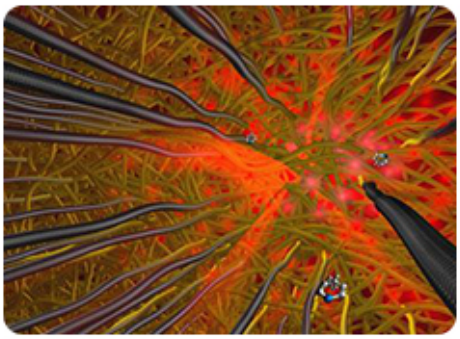
A new report from Lawrence Livermore suggests amino acids, the chemical building blocks necessary for life as we know it, may be scattered throughout the solar system. Riding high-speed comets, these building blocks are delivered when they smack into planets like our very own Earth.

"Amino acids have very basic starting materials -- you need some kind of carbon source like methane or carbon dioxide, a nitrogen source like ammonia, and water ice," said Nir Goldman, a physical chemist at Lawrence Livermore and a co-author of the study published recently in the journal *Nature Geoscience*. "Comets have all these things in abundance."

To read more, go to the *Los Angeles Times*.

EE Times

THE NOSE KNOWS



A new high-sensitivity sensor uses bundles of carbon nanotubes to enable ultra-sensitive chemical detection.

On the trail of sensors that can sniff out even a single molecule of a hazardous substance, scientists recently discovered that specially grown carbon nanotubes can greatly boost the sensitivity of a Raman spectroscope.

By boosting sensitivity by as much as 100,000 times, carbon-nanotube-enhanced Raman spectroscopes are approaching the goal of single-molecule detection in an inexpensive portable electronic nose (e-nose), according to scientists at the Eidgenossische Technische Hochschule in Switzerland and Lawrence Livermore National Laboratory. (Raman spectroscopy is a spectroscopic technique used to observe vibrational, rotational and other low-frequency modes in a system.)

Officially called surface-enhanced Raman spectroscopy (SERS), professor Hyung Gyu Park at ETH and Lawrence Livermore research scientist Tiziana Bond have found an easy-to-manufacture way to enhance SERS for e-nose applications.

To read more, go to *EE Times*.

LaserFocusWorld **EXTREME FOREIGN RELATIONS**

The High Repetition-Rate Advanced Petawatt Laser System, or HAPLS, will be designed, developed, assembled and tested at Lawrence Livermore.

Lawrence Livermore has been awarded $45 million to build an extreme laser near Prague in the Czech Republic.

The agreement will deliver the European Union's Extreme Light Infrastructure Beamlines laser system with performance far more advanced than current laser systems. This will allow the facility to undertake unprecedented research in areas as diverse as medical imaging, particle acceleration, homeland security and quantum physics, opening up applications in many areas of industry as well as academic research.

LLNL was chosen as the single preferred supplier because of its expertise in the research, development and engineering of sophisticated laser systems

To read more, go to *Laser Focus World*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send e-mail